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10/758,022	01/16/2004	Shoichi Okamura	SUT-0232	6241

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EXAMINER	
HO, ALLEN C	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 03/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/758,022	OKAMURA ET AL.	
	Examiner	Art Unit	
	Allen C. Ho	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: RADIOGRAPHIC APPARATUS THAT REMOVES TIME LAG BY RECURSIVE COMPUTATION.

Claim Objections

2. Claim 1 is objected to because of the following informalities:

Line 18, "detecting" should be replaced by --detection--.

Appropriate correction is required.

3. Claim 6 is objected to because of the following informalities:

Line 2, "detecting" should be replaced by --detection--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 3-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsieh (U. S. Patent No. 5,249,123).

With regard to claim 1, Hsieh disclosed a radiographic apparatus comprising: radiation emitting means (**13**) for emitting radiation toward an object under examination; radiation detection means (**14**) for detecting radiation after the radiation is emitted toward the object under examination; signal sampling means (**31**) for taking radiation detection signals from the radiation detection means at predetermined sampling time intervals; and time lag removing means (**26**) for determining lag-free radiation detection signals (x_k) by subtracting a radiation detection signal ($\sum_{n=1}^{N} \beta_n e^{-\Delta t/\tau_n} S_{nk}$) for a lag-behind part from the respective radiation detection signals ($y(k\Delta t)$) by a recursive computation (Eq. 5), on an assumption that, of the radiation detection signals taken by the signal sampling means at the predetermined sampling time intervals, the radiation detection signal for a lag-behind part left unread from the radiation detection means within the predetermined sampling time intervals, to be read at a next reading time and added to a radiation detection signal actually read at the next reading time, is due to an impulse response formed of one exponential function or a plurality of exponential functions with different attenuation time constants (column 1, lines 60 - column 2, line 2); the radiographic images being derived from the lag-free radiation detection signals obtained by the time lag removing means.

With regard to claims 3-5, these claims fail to set forth additional structural limitations. Accordingly, they are rejected with claim 1. MPEP § 2114.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh (U. S. Patent No. 5,249,123) as applied to claim 1 above.

With regard to claim 2, Hsieh disclosed a radiographic apparatus as defined in claim 1, wherein the time lag removing means is arranged to perform the recursive computation for removing the lag-behind part from each of the radiation detection signals, based on the equation

$$x_k = \frac{y_k - \sum_{n=1}^{N} \alpha_n \left(1 - e^{T_n}\right) e^{T_n} S_{nk}}{\text{constant}}$$

However, Hsieh failed to disclose

$$x_k = y_k - \sum_{n=1}^{N} \alpha_n \left(1 - e^{T_n}\right) e^{T_n} S_{nk}$$

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ the equation with or without a scaling constant, since a person would be motivated to scale the signal according to a preferred image brightness scale.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh (U. S. Patent No. 5,249,123) as applied to claim 1 above, and further in view of Roos *et al.* (U. S. Patent No. 6,041,097).

With regard to claim 6, Hsieh disclosed a radiographic apparatus as defined in claim 1. However, Hsieh failed to disclose a flat panel x-ray detector.

Roos *et al.* disclosed a CT system comprising a flat panel x-ray detector. Roos *et al.* taught that a flat panel detector would provide a volumetric image data acquisition system which improves x-ray utilization resulting in faster patient scan times and reduced radiation dose (column 2, lines 53-57). In addition, a flat panel x-ray detector has improved spatial resolution due to its fine detector matrix spacings (column 2, lines 58-62).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an x-ray flat panel detector as the radiation detecting means, since a person would be motivated to achieve the above mentioned advantages.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1, 2, and 6 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 9, 14, 15 of U.S. Patent No. 7,006,599 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other.

With regard to claims 1 and 2, claim 15 of U.S. Patent No. 7,006,599 B2 claims a radiographic apparatus comprising: radiation emitting means; radiation detection means; signal sampling means; and time lag removing means for determining lag-free radiation detection signals by subtracting a radiation detection signal for a lag-behind part from the respective radiation detection signals by a recursive computation.

With regard to claim 6, claims 9 and 14 of U.S. Patent No. 7,006,599 B2 claim a radiographic apparatus as defined in claim 1, wherein the radiation detection means is a flat panel x-ray detector having numerous radiation detecting elements formed of a semiconductor and arranged longitudinally and transversely on a radiation detecting surface.

11. Claims 1, 2, and 6 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 4, 10, and 11 of copending Application No. 10/885,634. Although the conflicting claims are not identical, they are not patentably distinct from each other.

12. Claims 1, 2, and 6 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, and 5 of copending Application No. 10/887,920. Although the conflicting claims are not identical, they are not patentably distinct from each other.

13. Claims 1, 2, and 6 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 5, and 6, of copending Application No. 10/901,212. Although the conflicting claims are not identical, they are not patentably distinct from each other.

14. Claims 1, 2, and 6 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, and 8 of copending Application No. 10/958,297. Although the conflicting claims are not identical, they are not patentably distinct from each other.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

15. Applicant's arguments filed 16 February 2006 with respect to claim 1 have been fully considered and are persuasive. The objection of claim 1 has been withdrawn.

16. Applicant's arguments filed 16 February 2006 have been fully considered but they are not persuasive.

The applicants argue that Hsieh disclosed a time lag removing means that corrects image by adding to an insufficiency Yk1 a radiation detection signal Yk1' that corresponds to the insufficiency Yk1. This argument is not persuasive. First, the applicants fail to point out the relevant sections in the reference that support this conclusion. Second, this argument is not directed to the claim language. Claim 1 claims a time lag removing means for determining lag-free radiation detection signals by subtracting a radiation detection signal for a lag-behind part

from the respective radiation detection signals by a recursive computation. Hsieh disclosed a time lag removing means (**26**) for determining lag-free radiation detection signals by a recursive equation (Eq. 5):

$$x_k = \frac{y(k\Delta t) - \sum_{n=1}^{N} \beta_n e^{-\Delta t/\tau_n} S_{nk}}{\sum_{n=1}^{N} \beta_n}$$

where x_k = lag-free radiation detection signal, $y(k\Delta t)$ = radiation detection signal, and $\sum_{n=1}^{N} \beta_n e^{-\Delta t/\tau_n} S_{nk}$ = radiation signal for a lag-behind part. Thus, this equation clearly reads on claim 1; *i. e.*, lag-free radiation detection signals (x_k) are determined by subtracting a radiation detection signal ($\sum_{n=1}^{N} \beta_n e^{-\Delta t/\tau_n} S_{nk}$) for a lag-behind part from the respective radiation detection signals ($y(k\Delta t)$) by a recursive computation. Furthermore, by making a few substitutions, this equation can be written as

$$x_k = \frac{y_k - \sum_{n=1}^{N} \alpha_n (1 - e^{T_n}) e^{T_n} S_{nk}}{\text{constant}}$$

where $\beta_n = \alpha_n (1 - e^{-\Delta t/\tau_n})$, $T_n = -\Delta t/\tau_n$, and constant $= \sum_{n=1}^{N} \beta_n$. A comparison between this equation and the equation recited in claim 2 shows that they are the same equation except for a scaling constant. This analysis does not support the reference figures supplied by the applicants. The examiner fails to see how two very different figures should result from basically the same equation. The examiner respectfully requests the applicants to provide additional information and analysis to support reference Fig. 1 and reference Fig. 2.

The applicants argue that the non-statutory obviousness-type double patenting rejections should be withdrawn in view of the amended claim 1. This argument is not persuasive. Claim 1 has been amended to clarify the definition of the lag-behind part, which is the basic definition of the lag-behind part or afterglow (Hsieh; column 1, lines 60 - column 2, line 2; column 2, lines 18-20). As such, it fails to change the function of the time lag removing means, which is to determine lag-free radiation detection signals by subtracting/removing a radiation detection signal for a lag-behind part from the respective radiation detection signals by a recursive computation.

For the above reasons, the rejections are being maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Allen C. Ho

Allen C. Ho
Primary Examiner
Art Unit 2882

27 March 2006